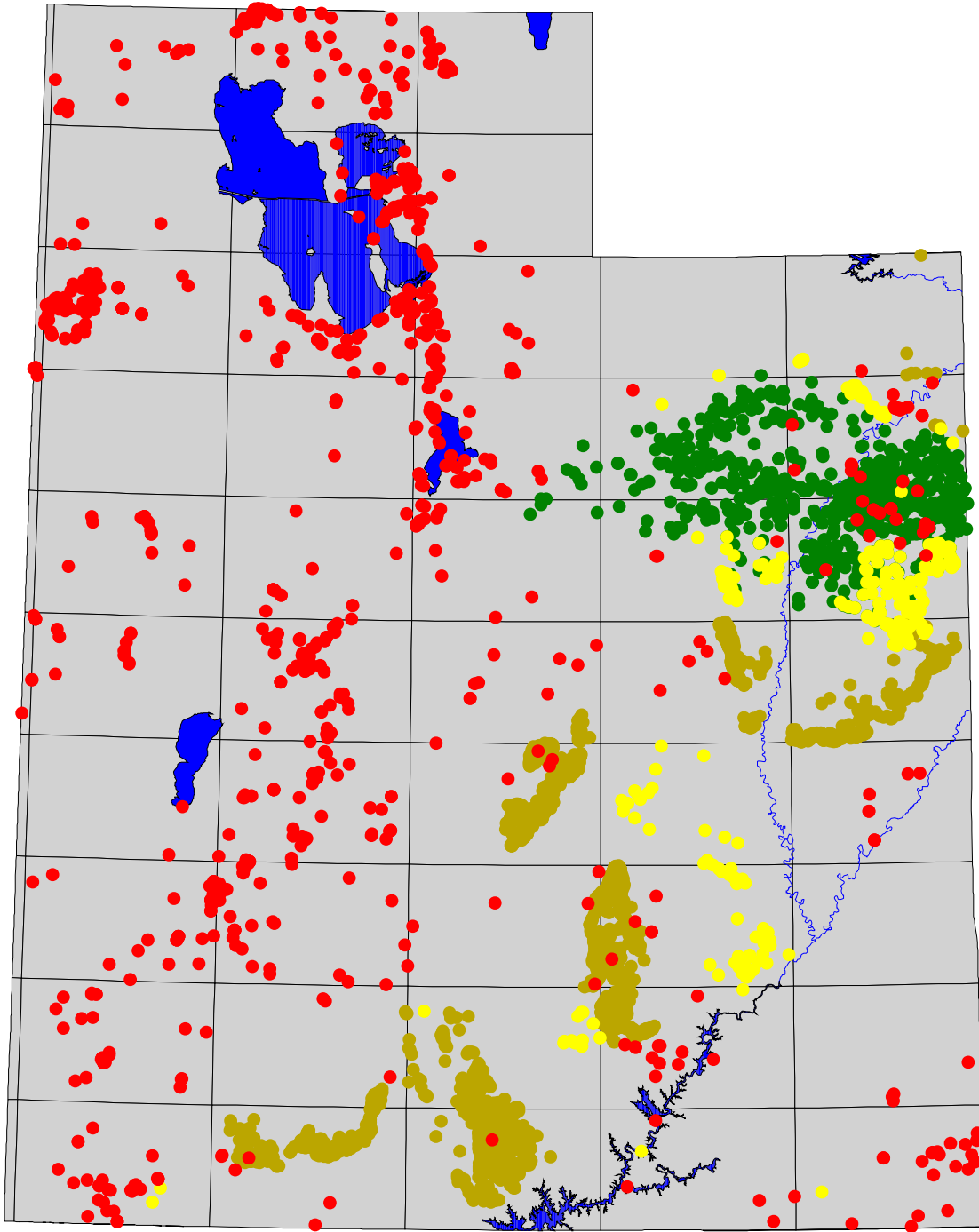


# DIGITAL GEOLOGIC RESOURCES ATLAS OF UTAH

compiled by  
**Douglas A. Sprinkel**  
Utah Geological Survey



**Bulletin 129DF**      **March 1999**  
**UTAH GEOLOGICAL SURVEY**  
*a division of*  
Utah Department of Natural Resources



On the cover:

Distribution of some of the energy resources data points included in this digital atlas. Each colored dot represents a different energy resource: gold = coal, red = geothermal, green = oil shale, and yellow = tar sand. The grid that overlays the map of Utah is the outline of the U.S. Geological Survey 30 x 60-minute quadrangle maps with their names.

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The UGS publishes the results of its investigations in the form of maps, reports, and compilations of data that are accessible to the public. For information on UGS publications, contact the Natural Resources Map/Bookstore, 1594 W. North Temple, Salt Lake City, Utah 84116, (801) 537-3320 or 1-888-UTAH MAP. E-mail: [nrugs.geostore@state.ut.us](mailto:nrugs.geostore@state.ut.us) and visit our web site at <http://www.ugs.state.ut.us>.

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# DIGITAL GEOLOGIC RESOURCES ATLAS OF UTAH

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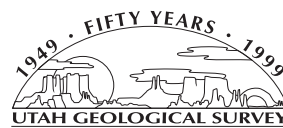
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## **ABSTRACT**

This digital atlas is a compilation of selected geologic resources spatial data and geographic spatial data in Utah. This atlas provides the energy and mineral-related spatial data files that are currently available through the Utah Geological Survey (UGS) and other government agencies. It also illustrates the distribution of these geologic resources in each of Utah's 30 x 60-minute quadrangle maps. The information in this digital atlas can help industry, decision-makers, and other interested parties identify exploration trends and understand energy, mineral, and water development as it relates to land-use issues. Although a comprehensive resource assessment is necessary to fully evaluate the geologic resources or land-use conflicts of an area, reviewing the data in an atlas like this is the first step in any comprehensive resource evaluation.

Several Geographic Information Systems (GIS) themes, or map layers, were compiled for this digital atlas. More than 600 megabytes of spatial data are included on this compact disk. Basic geographic spatial data such as roads, airports, and cities were provided by the Utah Automated Geographic Reference Center, Utah School and Institutional Trust Lands Administration, and U.S. Census Bureau. The geologic spatial data include energy and mineral resources as well as water-rights information. Geologic-based spatial data are mostly from the database files of the UGS (a division of the Utah Department of Natural Resources) and some files of the Utah State Office of the Bureau of Land Management. The water-rights spatial data are from the Utah Division of Water Rights (another division of the Utah Department of Natural Resources). With the exception of the roads theme, only geologic spatial data are briefly described in this report. The UGS continues to work on the geologic databases and intends to release updated versions in future publications.

## **INTRODUCTION**

### **Background and Purpose**

Mapping and documenting Utah's energy, mineral, and water resources are two of several critical tasks required to make decisions about land-use issues that affect the quality of life in Utah. Maps that show the location of these resources not only indicate their current distribution, but also may suggest possible resource trends and areas that have potential for additional discoveries. Conversely, these same maps can suggest areas that are not likely to host specific resources. However, to evaluate fully the geologic resource potential of an area, a comprehensive resource assessment must be completed. The creation of geologic resource maps using the spatial data contained in an atlas like this is the first step in such an evaluation.

The purpose of this atlas is to provide in digital form the energy, mineral, and water-rights spatial data that are currently available through the Utah Geological Survey (UGS) and other government agencies. The data contained on this compact disk can help industry, decision-makers, and other interested parties identify potential exploration trends and understand energy, mineral, and water development as it relates to land-use issues.

This digital atlas contains all of the spatial data that were used to create the page-size 30 x 60-minute quadrangle maps presented in a UGS open-file report (Sprinkel, 1999). The atlas also contains additional geographic spatial data not used in that report. The open-file report is included on this compact disk (Ofr363.pdf) because it complements this digital atlas by providing a hard copy version of the spatial data within the quadrangle subfolders.

### **Digital Information at the Utah Geological Survey**

The UGS has routinely collected, compiled, managed, and evaluated geologic data on the state's energy, mineral, and water resources as part of its mission for the past

50 years. The UGS maintains various databases of its own, relies on other government agencies as sources of specific geologic data, and gladly accepts data (including confidential data) donated by industry. Another part of the UGS's mission is to make the non-confidential data available to state and federal government agencies, the energy and mineral industries, and the public through released databases, maps, and reports. Historically, the data have been available only in paper data sheets and maps stored in files. However, for the past 18 years the UGS has created and maintained several digital databases containing much of this information. Some of the data are available in UGS publications as ASCII text files (see a current UGS publication list), and all published and some unpublished digital data are available for review at the UGS.

For this project, some of the larger UGS databases were converted to spatial data files (ArcView<sup>®</sup> shape files), which can be used by Geographic Information Systems (GIS) software. The UGS uses GIS technology for many of its projects because it provides an efficient tool to view, analyze, interpret, and map spatial data. This digital atlas is a product of GIS technology. By including the spatial data along with the GIS software to view and manipulate it, this compact disk makes the spatial data available to users who do not have access to the more sophisticated versions of GIS software. This digital atlas also allows individual users who do have access to sophisticated GIS software to combine, manipulate, and analyze the information for their own specific needs.

This digital atlas contains spatial data from several source databases. The amount of detail in individual source databases varies. Some databases contain hundreds of data fields, whereas others only contain a few data fields. Even within a database, the completeness of individual records is quite variable. This atlas is (and always will be) a work in progress and will be updated as new geologic data are acquired or as existing geologic data are systemically checked for errors. This version of the atlas consists of more than 600 megabytes of geologic and geographic spatial data.



## File Organization and Data Coverage

The spatial data and associated metadata files on this compact disk are contained in three main folders: (1) *All\_Utah*, (2) *3060quad*, and (3) *Metadata*. The *All\_Utah* folder contains several subfolders of geologic resource and geographic spatial data that cover Utah. The types of data in the subfolders are implied by the subfolder name; however, a more complete description of the data themes is included in table 1.

The *3060quad* folder contains 46 subfolders. Each subfolder contains the geologic resource and geographic spatial data files for the corresponding U.S. Geological Survey 30 x 60-minute quadrangle (1:100,000 scale). The subfolder name represents the name of the quadrangle. The spatial data sets in these subfolders are subsets of the statewide coverage. Thus, the file names include an abbreviation of the quadrangle name and the file name from which the spatial data were derived. For example, “smt\_tars” represents the tar sand data (tars) for the Smoky Mountain quadrangle (smt). The number and type of data points within each quadrangle, as well as a statewide total, are summarized in table 2.

The state of Utah is covered by all or part of about fifty-six 30 x 60-minute quadrangle maps (figure 1). A thin slice along Utah’s western border with Nevada consists of quadrangles that are mostly in Nevada. For this digital atlas, those thin slices have been appended to the adjacent quadrangle in Utah immediately to the east. For example, the Utah part of the Jackpot quadrangle is appended to the Grouse Creek quadrangle. The quadrangle map subfolders are organized in north-to-south rows starting with the Grouse Creek and part of the Jackpot 30 x 60-minute quadrangles in northwest Utah and ending with the Bluff quadrangle in the southeast (figure 1). Any quadrangle map subfolder may be quickly located on the compact disk by referring to figure 1.

Metadata files for most of the geographic and all of the geologic resource data sets are located in the *Metadata* folder. The metadata files pertain to the statewide GIS themes; however, they also are relevant to the corresponding quadrangle spatial data file since these data files were derived from the statewide themes.

## DESCRIPTION OF THE SPATIAL DATA

This section briefly describes the sources of data and some of the important attributes such as the scale at which the data were compiled; however, the metadata files provide a more complete description of the spatial data. As mentioned above, the amount of detail in the databases varies greatly. In addition, most of the databases have not been thoroughly edited. However, the UGS continues to work on these geologic databases and intends to release updated versions in future publications. It is beyond the scope of this publication to describe the limitations of the source databases. The owners of the source databases, which are listed in table 1, can provide additional information.

Several GIS themes, or map layers, are included in this atlas (table 1). Many themes are basic geographic spatial data such as roads, airports, and cities, whereas other themes are geologic. With the exception of roads, only geologic spatial data are described in this report. A description of the roads spatial data is included because the files created for the quadrangle subfolders were modified from the file "trrds" provided by the Utah Automated Geographic Reference Center. No additional data were added or revisions made to any of the geologic spatial data files after February 1999.

### Coal

Coal spatial data files included in this atlas are mainly from two UGS databases with some additional data provided by the Utah State Office of the Bureau of Land Management (UBLM) under a cooperative data-sharing agreement. The first coal data source for this atlas was the Utah Mineral Occurrence System (UMOS) database. The "coalumos" spatial data file contains UMOS information about coal mines, prospects, and coal tracts statewide. The information in this database took more than a decade to compile, with partial funding provided to the UGS from the U.S. Bureau of Land Management (BLM), U.S. Bureau of Mines (USBM), and U.S. Geological Survey

(USGS). A more detailed description of UMOS is located in the “Minerals” section of this report.

A second source of coal data was the National Coal Resources Data System (NCRDS). The “coalncrd” spatial data file contains NCRDS information about coal drill holes and measured sections from the Alton, southern Book Cliffs, Emery, Henrys Fork, Henry Mountains, Kaiparowits Plateau, Kolob, San Juan, Sego, Tabby Mountain, and Vernal coalfields. Equal numbers of NCRDS data points from other coalfields were not included because of time constraints; however, the UGS will include the data in future releases of this atlas. Because some of the coal data in the NCRDS database are confidential, only the locations of the data points are provided in this atlas. The UGS collected the data for the NCRDS database over many years with cost-share funding from various USGS grants.

A third source of coal data is the UBLM under a cooperative data-sharing agreement. These data are for confidential coal exploration drill holes in the Kaiparowits Plateau coalfield, and their locations are included in the “coalumos” data file.

## Geothermal

The geothermal spatial data are derived from three sources: (1) a data set “hh2o” compiled by Blackett (1994) from UGS and USGS databases, (2) a UBLM database “hh2w”, and (3) the UMOS database “hh2u”. The data set compiled by Blackett (1994) contains information on thermal wells and springs that have temperatures of 20 °C (68 °F) or greater. The geothermal data from the UBLM came from its oil and gas spatial data file, which is available on the World Wide Web (table1). The UBLM data pertain only to drill holes. Some of the drill holes are productive geothermal wells in “Known Geothermal Resource Areas” (KGRA), but other drill holes are non-productive exploratory wells. The accuracy of the geothermal locations derived from both databases was checked to make sure they plotted in the correct county. The geothermal data derived from the UMOS database includes thermal springs and wells mostly from

KGRAs and commercially developed ventures. A more detailed description of the UMOS database is in the “Minerals” section of this report.

## Minerals

Nearly all of the data on metallic mineral deposits, industrial rock and mineral deposits, and uranium and vanadium mineral deposits contained in the “minerals” spatial data file are from the UMOS database. The database contains information on approximately 8,900 metallic and non-metallic mines, prospects, and occurrences in Utah. The database includes about 5,300 metallic and industrial rock and mineral records and more than 1,000 uranium records. Nearly 2,000 of the UMOS records are for sand and gravel pits and deposits.

The UMOS database was developed as part of a ten-year cooperative program between the BLM, USGS, and UGS. The database was initially part of the national Computerized Resource Information Bank (CRIB) and was later renamed the Mineral Resource Data System (MRDS) by the USGS. The UGS version of the database was renamed UMOS because it differs slightly from MRDS.

The data in UMOS are available at the UGS in both hard copy and digital format. The hard copy includes maps and text in UGS files. These files are arranged by county and within the county by USGS quadrangle maps, usually 1:24,000 scale but occasionally 1:62,500 scale. The location of each record is plotted on the quadrangle and the record itself is either a standard eight-page data sheet (early format) or a standard six-page data sheet (later format). Both formats have identical data fields. In addition to the hard-copy data sheets for the individual mines and prospects, these files contain mine maps, geologic reports, sample and assay sheets, other information that does not fit into the established database format, and information that became available after the record was completed.

During the ten-year database compilation period, UGS personnel researched the published literature on each 7.5-minute quadrangle in Utah and examined the quadrangle maps for mine or prospect symbols. This compilation was followed by on-site

examinations of more than 90 percent of the mines, prospects, and other workings in the database. Most of the major mines and prospects in the state are included in the database. A number of smaller mines and prospects may have been overlooked particularly if they are not shown on the topographic maps, not reached by an obvious road or track, not easily seen from roads, or are not in a well-defined mining district or area.

About 85 percent of the mineral occurrences (more than 95 percent for metallic minerals) have some type of workings, although they are not fully described in the database. The size and number of the workings included in an individual record vary greatly. Generally, individual records encompass a single operation, claim or claim group, or named mine. Some individual records represent operations that may have up to 10 or more pits, adits or shafts, or multiple groups of workings. Other single records represent giant workings such as the Bingham pit. Still other individual records represent operations that consist of small prospect pits and adits with little or no production or sometimes no obvious mineralization. Some records, particularly for industrial minerals, do not always have associated workings. These records are for particular geologic formations or zones that contain potentially extractable commodities, and are assigned an arbitrary central outcrop point location. Examples of records that fall into this category include minable phosphate beds, surface and subsurface brines, gypsum sand dunes, gypsum beds, and high-calcium limestone beds.

The “minerals” spatial data file contains 152 data fields that describe the mineral occurrence location, identify the commodity, and contain many other attributes. A more detailed description of the data fields is in the metadata. In the “minerals” spatial data file, all records have a unique record number and most also have a specific mine or prospect name. All records have Universal Transverse Mercator (UTM) location coordinates, most have cadastral (section, township, and range) locations, and many have geodetic (latitude and longitude) locations. UTM coordinates are usually accurate to the scale of the topographic map used; most record locations are accurate to within 50 meters (164 ft) and nearly all are accurate to within 200 meters (656 ft). The commodity type is identified in all records. For most records, one or more major commodities (copper, lead, sand/gravel, limestone, and others) are identified, but for some prospects (fewer than 7 percent) the commodity is “unknown.” Some exploration prospects have been

developed on quartz veins or iron-stained zones where no valuable commodity is identified, and are classified as "unknown." In other cases, the commodity may be present but was unrecognized by the reporter; precious metal veins are a good example since gold is often only detected by assaying. The records are generally accurate for the major commodities listed; however, identification and listing of the commodities do not imply that the prospect or mine could be profitably developed. They only indicate the presence of a valuable commodity.

Some information is not included in the database. Examples include drill holes and intercepts, unannounced or "unadvertised" new discoveries, and geochemical or geophysical anomalies. This type of information is often of much greater importance and significance than information in the database on minor occurrences.

### Oil Shale

The oil shale spatial data file "oilshale" is derived from database files at the UGS. Some of the oil shale records are from the UMOS database. Refer to the "Minerals" section for a description of the UMOS database. Oil shale locations were checked to make sure that they plotted in the correct county. Other oil shale records come from paper files at the UGS and published reports by the USGS, U.S. Department of Energy (DOE), and USBM. Nearly all of the data are drill hole locations. Their UTM coordinates were mathematically determined from their cadastral locations within a 640-acre section. Thus, the UTM coordinates determined for the oil shale locations that are in irregular sections (more or fewer than 640 acres) are accurate to within 160 acres.

### Oil and Gas

The oil and gas spatial data file "og\_wells" is from the UBLM; their data are available and regularly updated on the World Wide Web (table1). The UBLM compiled the data at 1:24,000 scale. The UBLM oil and gas spatial data file also includes geothermal locations. Thus, all of the geothermal wells were extracted from this file to

prevent duplications with the geothermal data previously described in the “Geothermal” section of this report.

The oil and gas spatial data file includes several data fields such as well name, operator name, well status, total depth, and others. The “well status” data field includes producing wells, shut-in wells, abandoned wells, injection wells, disposal wells, and other well types. Only the record locations were checked to make sure they plotted in the correct county. None of the other information contained within the database was systematically checked for accuracy and completeness.

### Tar Sand

The tar sand spatial data file "tarsand" is derived from database files at the UGS. Some of the tar sand records were extracted from the UMOS database. Refer to the “Minerals” section for a description of the UMOS database. The tar sand locations within UMOS were checked to make sure they plotted in the correct county. Other tar sand records come from paper files at the UGS and published reports by the USGS, DOE, and USBM. Nearly all of the data are drill hole locations. Their UTM coordinates were mathematically determined from their cadastral locations within a 640-acre section. Thus, the UTM coordinates determined for the tar sand locations that are in irregular sections (more or less than 640 acres) are accurate to within 160 acres.

### Water Rights

The water rights records are from the “Dams” ("wrdams") and “Point of Diversion” ("wrpod") spatial data files maintained by the Utah Division of Water Rights (WR). Both files are available on the WR web site (table1). The “Dams” spatial data file is comprehensive and thoroughly attributed. All of the dams in this spatial data file are included in this atlas. The “Point of Diversion” spatial data file is also comprehensive and thoroughly attributed. All of the records in this spatial data file are included in this atlas; however, the data included in the quadrangle subfolders (for example, the

“smt\_h2ow” file in subfolder *30smoky*) contain only approved and perfected underground water rights.

## Roads

The roads theme is the only non-geologic GIS theme described in this report because the spatial data files created for the quadrangle subfolders were modified or revised from the original Automated Geographic Reference Center data file "trrds". The "trrds" spatial data are from the USGS 1:100,000-scale Digital Line Graph (DLG) version of each 30 x 60-minute quadrangle, and the file is attributed with codes to denote road types that range from primary (or paved) routes to pack trails. For the quadrangle subfolders and UGS Open-File Report 364 (Sprinkel, 1999), all records coded as four-wheel-drive routes or jeep or pack trails were removed to reduce the file size and the amount of lines displayed on the open-file maps. Thus, only paved, improved gravel, and dirt/gravel roads are shown on the maps in the open-file report. In addition to removing the routes and trails mentioned above, many of the city streets were removed from the larger cities on the Ogden, Provo, and Salt Lake City quadrangles to reduce file size. Many of the quadrangles were randomly spot checked to look for inconsistencies between the road types coded in the data file and the road types identified on the USGS paper 30 x 60-minute quadrangle maps. No changes were made to the statewide “trrds” spatial data file.

## ACKNOWLEDGMENTS

Any project of this magnitude is not completed without the help of many others. I thank Gen Green, School and Institutional Trust Lands Administration, for providing the land ownership and land exchange spatial data; Matt Peters and Gordon Douglas, Automated Geographic Reference Center, for providing the wilderness and other geographic spatial data from the State Geographic Information Database or SGID; and Boyd Clayton, Division of Water Rights, for providing the water rights spatial data and



clarifying information in the metadata files. I also thank the project's team members for all of their hard work, suggestions, and timeliness. I especially thank John Hanson (UGS) and Kelli Bacon (formerly UGS and now Utah Department of Transportation) for all of their help using ArcView. They provided timesaving suggestions and tools that shortened my learning curve and allowed the completion of this project on time. Finally, I thank Bryce Tripp, Mike Hylland, and Dave Tabet (UGS) for their review of documents in this digital atlas.

This project would also have been impossible without the efforts of dozens of current and former UGS, USGS, BLM, and other federal and state workers who created, contributed to, and maintained the databases used in this atlas.

## **REFERENCES**

- Blackett, R.E., 1994, Data release of low-temperature geothermal water in Utah: Utah Geological Survey Open-File Report 311DF, 1 disk in Quattro Pro<sup>®</sup>.
- Sprinkel, D.A., compiler, 1999, A summary of the geologic resource atlas of Utah: Utah Geological Survey Open-File Report 364, 154 p.

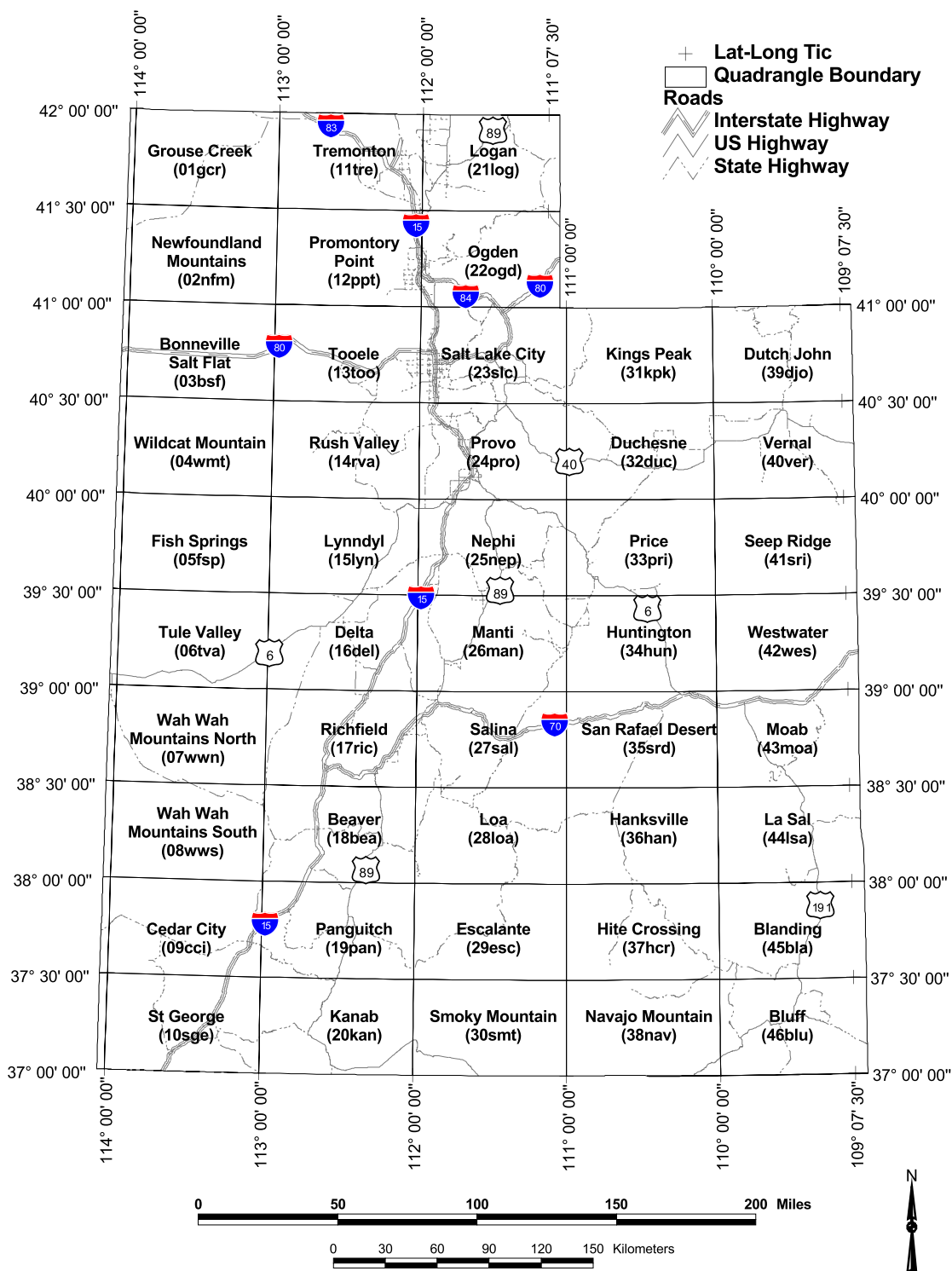


Figure 1. Index of the U.S. Geological Survey 30 x 60-minute quadrangle maps in Utah, showing names of quadrangles and corresponding subfolders in the "3060quad" folder.

**Table 1.** Spatial data themes within the *ALL\_UTAH* folder of this digital atlas.

Subfolder	Theme	File	Scale	Date	Agency	Internet Location
Cities	Utah Cities/Towns	utcities	unknown	10/20/98	USCB	<a href="http://ftp.census.gov/geo/www/gazetteer/places.html">http://ftp.census.gov/geo/www/gazetteer/places.html</a>
Coal	Coal (ncrds)	coalncrd	1:24,000	11/19/98	UGS	under construction
Coal	Coal (umos)	coalumos	1:62,500	02/04/99	UGS	under construction
Contours	Topography	hpcon	1:500,000	02/04/99	AGRC	<a href="ftp://ftp.state.ut.us/ftpagrc/sgid/">ftp://ftp.state.ut.us/ftpagrc/sgid/</a>
County	County Boundaries	aocbo	1:500,000	07/15/98	AGRC	<a href="ftp://ftp.state.ut.us/ftpagrc/sgid/">ftp://ftp.state.ut.us/ftpagrc/sgid/</a>
Geotherm	Geothermal (Blackett, 1994)	hh2o	1:100,000	11/24/98	UGS	under construction
Geotherm	Geothermal (UMOS)	hh2u	1:24,000	02/10/99	UGS	under construction
Geotherm	Geothermal (BLM og_wells)	hh2w	1:24,000	11/05/98	UBLM	<a href="ftp://ftp.ut.blm.gov/pub/gis/minerals">ftp://ftp.ut.blm.gov/pub/gis/minerals</a>
Landstat	Land Ownership	aolsa	1:100,000	06/19/97	SITLA	<a href="ftp://lands1.state.ut.us/pub/">ftp://lands1.state.ut.us/pub/</a>
Landstat	Land Exchange to USA	exchlose	1:100,000	12/03/98	SITLA	<a href="ftp://lands1.state.ut.us/pub/exch3830">ftp://lands1.state.ut.us/pub/exch3830</a>
Landstat	Land Exchange to Utah	exchrecv	1:100,000	12/03/98	SITLA	<a href="ftp://lands1.state.ut.us/pub/exch3830">ftp://lands1.state.ut.us/pub/exch3830</a>
Lat_long	Lat-Long Tic	graticul	1:100,000	12/22/98	UGS	under construction
Lat_long	Lat-long Grid	rslal	1:500,000	02/25/98	AGRC	<a href="ftp://ftp.state.ut.us/ftpagrc/sgid/">ftp://ftp.state.ut.us/ftpagrc/sgid/</a>
Mapindex	30' x 60' Quad Index	index10	1:500,000	09/16/98	AGRC	<a href="ftp://ftp.state.ut.us/ftpagrc/sgid/">ftp://ftp.state.ut.us/ftpagrc/sgid/</a>
Mapindex	7.5-minute Quad Index	index24	1:500,000	09/16/98	AGRC	<a href="ftp://ftp.state.ut.us/ftpagrc/sgid/">ftp://ftp.state.ut.us/ftpagrc/sgid/</a>
Mapindex	30' x 60' Quad Index (clipped)	uquad100	1:500,000	10/02/98	UGS	under construction
Minerals	Minerals	minerals	1:62,500	02/10/99	UGS	under construction
Misc	Power Plants	powerpln	unknown	10/06/98	original source unknown	
Misc	Microwave	utmwv	1:500,000	10/06/98	AGRC	<a href="ftp://ftp.state.ut.us/ftpagrc/sgid/">ftp://ftp.state.ut.us/ftpagrc/sgid/</a>
Petroles	Oil & Gas Wells	og_wells	1:24,000	11/06/98	UBLM	<a href="ftp://ftp.ut.blm.gov/pub/gis/minerals">ftp://ftp.ut.blm.gov/pub/gis/minerals</a>
Petroles	Oil Shale	oilshale	1:62,500	02/04/99	UGS	under construction
Petroles	Tar Sand	tarsand	1:62,500	02/04/99	UGS	under construction
Transprt	Airports	trair	1:100,000	10/06/98	AGRC	<a href="ftp://ftp.state.ut.us/ftpagrc/sgid/">ftp://ftp.state.ut.us/ftpagrc/sgid/</a>
Transprt	Roads	trrds	1:100,000	10/02/98	AGRC	<a href="ftp://ftp.state.ut.us/ftpagrc/sgid/">ftp://ftp.state.ut.us/ftpagrc/sgid/</a>
Trgrid	Township/Range Grid	rspls	1:500,000	09/12/97	AGRC	<a href="ftp://ftp.state.ut.us/ftpagrc/sgid/">ftp://ftp.state.ut.us/ftpagrc/sgid/</a>
Trgrid	Township/Range/Section Grid	secgrid	1:500,000	07/10/97	original source unknown	
Water	Great Salt Lake Shorelines	hdgsl	1:500,000	09/23/98	AGRC	<a href="ftp://ftp.state.ut.us/ftpagrc/sgid/">ftp://ftp.state.ut.us/ftpagrc/sgid/</a>
Water	Water Bodies (lakes,etc)	hdwbo	1:500,000	09/23/98	AGRC	<a href="ftp://ftp.state.ut.us/ftpagrc/sgid/">ftp://ftp.state.ut.us/ftpagrc/sgid/</a>
Water	Water Courses (streams)	hdwco	1:500,000	09/17/98	AGRC	<a href="ftp://ftp.state.ut.us/ftpagrc/sgid/">ftp://ftp.state.ut.us/ftpagrc/sgid/</a>
Water	Dams	wrdams	1:24,000	10/23/98	WR	<a href="http://nrwrt1.nr.state.ut.us/arcinfo/basemaps.html">http://nrwrt1.nr.state.ut.us/arcinfo/basemaps.html</a>
Water	Water Rights	wrpod	1:24,000	10/08/98	WR	<a href="http://nrwrt1.nr.state.ut.us/arcinfo/basemaps.html">http://nrwrt1.nr.state.ut.us/arcinfo/basemaps.html</a>
Water	Streams	wrstreams	1:100,000	10/14/98	WR	<a href="http://nrwrt1.nr.state.ut.us/arcinfo/basemaps.html">http://nrwrt1.nr.state.ut.us/arcinfo/basemaps.html</a>
Wildland	UWC 1996 wilderness inventory	aopw1	1:100,000	12/01/98	AGRC	<a href="ftp://ftp.state.ut.us/ftpagrc/sgid/">ftp://ftp.state.ut.us/ftpagrc/sgid/</a>
Wildland	HR1500 (Owens Bill)	aopw2	1:100,000	12/01/98	AGRC	<a href="ftp://ftp.state.ut.us/ftpagrc/sgid/">ftp://ftp.state.ut.us/ftpagrc/sgid/</a>
Wildland	BLM WSA	aowsa	1:500,000	09/16/98	AGRC	<a href="ftp://ftp.state.ut.us/ftpagrc/sgid/">ftp://ftp.state.ut.us/ftpagrc/sgid/</a>
Wildland	UWC 1998 wilderness inventory	cwi98	beta	02/03/99	AGRC	beta version

AGRC = Utah Automated Geographic Reference Center

NCRDS = National Coal Resources Data System

SITLA = Utah School and Institutional Trust Lands Administration

UBLM = Utah State Office of the Bureau of Land Management

UGS = Utah Geological Survey (Dept. Natural Resources)

UMOS = Utah Mineral Occurrence System

USCB = U.S. Census Bureau

UWC = Utah Wilderness Coalition

WR = Utah Water Rights (Dept. Natural Resources)

**Table 2.** Summary of data points in each 30 x 60-minute quadrangle with statewide total as of December 1998.

Number	Quadrangle Name	Water Rights (underground)	Dams	Geothermal	Uranium	Tar Sand	Oil Shale	Coal	Oil & Gas	Minerals	Airport	Power Plant	Communications
1	Grouse Creek	539	9	13	0	0	0	0	5	144	0	0	0
2	Newfoundland Mountains	55	0	4	0	0	0	0	2	155	0	0	0
3	Bonneville Salt Flat	75	0	71	0	0	0	0	2	103	1	0	3
4	Wildcat Mountain	65	1	2	0	0	0	0	0	259	0	0	0
5	Fish Springs	164	4	20	5	0	0	0	1	206	0	0	0
6	Tule Valley	117	2	20	0	0	0	0	8	69	0	0	0
7	Wah Wah Mountains N	75	5	2	2	0	0	0	19	55	1	0	1
8	Wah Wah Mountains S	1,382	9	40	4	0	0	0	1	189	1	0	0
9	Cedar City	5,617	26	28	8	0	0	6	7	204	1	0	2
10	St. George	2,097	29	32	12	2	0	0	239	237	2	0	2
11	Tremonton	2,382	15	73	0	0	0	0	33	124	2	1	0
12	Promontory Point	3,600	9	60	0	0	0	0	42	111	1	0	1
13	Tooele	4,735	28	80	0	0	0	0	17	234	4	3	3
14	Rush Valley	1,095	6	5	0	0	0	0	7	344	1	0	0
15	Lynndyl	431	12	16	0	0	0	0	4	366	0	2	0
16	Delta	2,916	11	60	0	0	0	0	13	105	1	0	0
17	Richfield	2,164	18	73	12	0	0	0	11	160	2	1	2
18	Beaver	1,626	26	43	36	0	0	0	6	232	2	0	0
19	Panguitch	1,992	16	24	0	0	0	43	16	123	3	0	0
20	Kanab	758	19	6	5	0	0	457	11	35	1	0	0
21	Logan	4,396	32	30	0	0	0	0	40	106	1	0	2
22	Ogden	3,531	73	16	0	0	0	0	121	110	2	1	3
23	Salt Lake City	15,210	102	56	0	0	0	17	166	455	6	1	5
24	Provo	10,905	58	80	0	0	8	0	36	230	4	1	4
25	Nephi	2,333	39	18	0	4	3	5	88	117	2	4	0
26	Manti	2,468	58	9	0	0	0	41	163	125	2	8	2
27	Salina	528	32	5	9	0	0	1,011	65	61	0	3	0
28	Loa	466	27	5	18	0	0	179	23	60	1	0	1
29	Escalante	251	17	0	35	13	0	124	95	41	1	1	1
30	Smoky Mountain	103	2	1	4	0	0	630	13	23	0	0	0
31	Kings Peak	293	61	0	0	2	1	2	53	21	0	0	0
32	Duchesne	2,189	45	1	0	14	162	5	1,583	66	3	0	1
33	Price	344	10	3	0	32	61	0	388	23	1	9	2
34	Huntington	67	25	5	16	0	0	200	154	37	1	0	1
35	San Rafael Desert	42	4	0	158	18	0	0	132	31	1	0	0
36	Hanksville	111	1	5	26	38	0	870	98	14	1	0	0
37	Hite Crossing	42	3	13	120	1	0	440	31	27	2	0	0
38	Navajo Mountain	15	0	5	10	1	0	0	25	3	1	0	0
39	Dutch John	515	35	1	4	12	0	20	106	67	2	0	0
40	Vernal	2,033	35	26	7	49	258	18	2,197	40	1	0	2
41	Seep Ridge	77	2	28	3	130	383	0	1,026	1	0	1	0
42	Westwater	10	1	0	4	39	5	412	1,132	4	0	0	0
43	Moab	1,314	11	8	138	0	0	0	377	71	2	0	2
44	La Sal	470	12		205	0	0	0	198	34	1	0	0
45	Blanding	988	20	4	156	0	0	3	347	16	2	0	0
46	Bluff	276	0	21	12	1	0	0	2,314	21	2	0	0
Utah Total		80,862	950	1,012	1,009	356	881	4,477	11,415	5,259	62	36	40